



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: ELENIUS, PETER ET AL. )  
SERIAL NO.: 09/575,298 )  
FILED: May 19, 2000 )  
FOR: "SOLDER BAR FOR HIGH POWER )  
FLIP CHIPS"

## Art Unit 1725

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JAN 10 2001  
TECHNOLOGY CENTER 28000

## **DISCLOSURE STATEMENT**

10 Honorable Commissioner for Patents  
Washington, D.C. 20231

11 | Dear Sir:

12 Please make of record in the above-identified patent application the references identified  
13 below. The references identified below should be considered during the examination of the  
14 present application.

15 In accordance with 37 C.F.R. §1.98, copies of the references listed below accompany this  
16 Disclosure Statement. Pursuant to MPEP §609, this Disclosure Statement is accompanied by  
17 Form PTO-1449, entitled "Information Disclosure Citation" listing the references set forth  
18 below. *101700* *JAN* *RECEIVED*

19 A concise explanation of the relevance of each references follows the listing thereof.

20	<u>U.S. Patent No.</u>	<u>Inventor Name</u>	<u>Issue Date</u>
	5,261,593	Casson, et al.	Nov. 16, 1993
21	5,220,200	Blanton	Jun. 15, 1993
	5,547,740	Higdon, et al.	Aug. 20, 1996
22	5,564,617	Degani, et al.	Oct. 15, 1996

## OTHER DOCUMENTS

Excerpts from the Web site for "The Surface Evolver", Kenneth A. Brakke, Mathematics  
Department, Susquehanna University, Selinsgrove, PA 17870, Version 2.14, dated August 18,  
1999, including Surface Evolver Overview; Surface Evolver Documentation: Example: Column  
of Liquid Solder; Newsletter No. 2 (2/26/93); and Newsletter No. 8 (6/23/94).

1 Brandenburg, Scott and Yeh, Shing, "Electromigration Studies Of Flip Chip Bump .  
2 Solder Joints", *Proceedings Surface Mount International 1998*, September 1998.

3 **Cncise Explanation of the Relevance**  
4 **of the Above-Mentioned References**

5 U.S. Patent No. 5,261,593 to Casson, et al

6 This patent generally discloses the use of solder bumps to interconnect flip chip  
7 integrated circuits to underlying support substrates. More specifically, it discloses a method of  
8 electrically connecting unpackaged flip chip integrated circuits to a printed circuit substrate using  
9 solder bumps and contact pads bearing solder paste.

10

11 U.S. Patent No. 5,220, 200 to Blanton

12 This patent generally discloses the use of solder bumps to interconnect flip chip  
13 integrated circuits to underlying support substrates. More specifically, it discloses a flip chip  
14 structure wherein an integrated circuit 10 is joined to substrate 30 by solder bumps 20.

15

16 U.S. Patent No. 5,547,740 to Higdon, et al.

17 This patent generally discloses the use of solder bumps to interconnect flip chip  
18 integrated circuits to underlying support substrates. More specifically, it discloses a flip chip  
19 integrated circuit having solder bumps spaced apart from the perimeter of the integrated circuit  
20 device, and including electrically conductive runners extending between the perimeter of the  
21 device and solder bumps spaced from such perimeter.

22

23 U.S. Patent No. 5,564,617 to Degani, et al.

24 This patent generally discloses the use of solder bumps to interconnect flip chip  
25 integrated circuits to underlying support substrates. More specifically, it discloses a multichip  
26 module using flip chip bonding technology wherein integrated circuit chips 35 having solder  
27 wettable metal pads 37 are joined with corresponding solder paste patterns 36 on a substrate 32  
28 to form solder joints 38.

1 Web site for "The Surface Evolver", Kenneth A. Brakke

2 The Surface Evolver software is mentioned within the specification filed in the present  
3 application for computer-modeling solder bar volumes. The "Surface Evolver Overview"  
4 mentions that such software has been used to model the shape of molten solder on microcircuits.  
5 The "Surface Evolver Documentation:Example: Column of liquid solder" sets forth an example  
6 of using Surface Evolver software to model a drop of solder bridging between two circular solder  
7 pads. "Surface Evolver Newsletter No. 2", dated February 26, 1993, mentions several articles by  
8 L.M. Racz and J. Szekely relating to shapes and volumes of solder in surface mount technology  
9 applications. "Surface Evolver Newsletter No. 8", dated June 23, 1994, mentions that the  
10 aforementioned example of a column of liquid solder was added to the Tutorial Chapter of the  
11 Surface Evolver Manual by June of 1994.

12

13 Scott Brandenburg and Shing Yeh, "Electromigration Studies Of Flip Chip Bump Solder Joints"

14 This article describes the problem of migration of bump solder in the direction of electron  
15 flow, which can result in open-circuit failures at a solder bump over time in the presence of high  
16 current densities.

17

Respectfully submitted,

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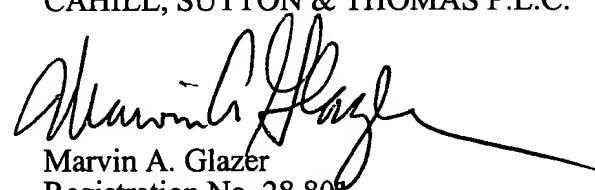
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Docket No. 5833-A-11

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I hereby certify that this correspondence is being deposited with  
the United States Postal Service as first class mail in an envelope  
addressed to: Commissioner for Patents, Washington, D.C. on:  
December 29, 2000

Marvin A. Glazer

Name of Registered Rep.

Marvin A. Glazer

Signature

Dec. 29, 2000

Date

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16 **TRANSMITTAL LETTER**

17 Honorable Commissioner for Patents  
18 Washington, D.C. 20231

19 Dear Sir:

20 In regard to the above-identified patent application, Applicants hereby enclose the  
21 following:

22 1. Disclosure Statement;  
23 2. Information Disclosure Citation Form PTO-1449; and  
24 3. Copies of the cited references

25 Please charge any additional fees required by this paper to Deposit Account No.

26 03-0088.

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1           Two duplicate copies of this Transmittal Letter are also enclosed.  
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Respectfully submitted,

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10           Docket No. 5488-A-11  
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